

IN THE SPECIFICATION:

At page 1, line 6, please insert new headings and text as follows:

CROSS REFERENCE TO RELATED APPLICATIONS

This application is the U.S. National Stage of International Application PCT/IB02/00556 filed February 26, 2002.

BACKGROUND OF THE INVENTION

At page 1, the paragraph beginning at line 7 has been amended as follows:

The present invention relates to mobile terminal devices having the capability of communicating via different communication connections. The present invention relates to user devices that can access services via more than one data transfer connection, e.g. via UMTS and Bluetooth. It also relates to programs and applications executable in a mobile terminal device with a ~~minimised~~minimized requirement of user interaction. More specifically the invention relates to a simple method to adapt the settings of applications in a mobile terminal device, according to actually accessible, available or selected communication connections.

At page 2, the first paragraph beginning on line 3 has been amended as follows:

The state of the art provides e.g. a "Method and system for increasing the quality of service at or below a threshold cost" of EP 0 848 560 A2 by Siemens Business Communication systems, which relates to the control of the selection of a data transfer connection in accordance with a predetermined threshold cost. In this document the selection of the data transfer connection is executed according to

predetermined ~~optimisation~~optimization algorithms, to provide the service with the best transmission quality at a given cost. The document describes an automatic data transmission connection selection, but not a simplification of the access or application parameters of a certain application.

At page 2, the paragraph beginning on line 26 has been amended and followed by a new heading as follows:

If the selectable data connections depend on different transfer modes, with different transfer properties, it is desirable to fit the performances of the transfer channel and an application using that channel, to ~~optimise~~optimize the overall performance.

BRIEF SUMMARY OF THE INVENTION

At page 3, the first paragraph beginning on line 1 has been amended as follows:

The present invention also desires to ~~minimise~~minimize the cost of a certain service for the user of the terminal device.

At page 3, the paragraph beginning on line 6 through the paragraph ending on page 5, line 6 have been amended as follows:

According to a first aspect of the present invention, there is provided a method for adapting the configuration of an application of a mobile terminal device (MTD) to an accessible data connection. The MTD is capable of multi-mode-, multi-band or multi-interface communication, and the characteristics of a communication link used by the terminal device depend on the actually selected data transmission connection. As the transmission characteristics change, the characteristic settings of applications using the connections have to be changed accordingly, to provide an ~~optimised~~optimized service. The method is executed by the steps of: obtaining information about at least one accessible data connection ~~aeccessible~~, (may be after

requesting said ~~information~~information), and setting the ~~configurations~~configuration of at least one application on said terminal device in accordance with the obtained information about said accessible data connection.

The currently accessible data connection can be e.g. an exclusively selected data connection, if the terminal device is capable of operating only one connection at a time. Such terminal devices can e.g. comprise different transceivers for different transmission frequencies and modes, but only one base band processing means to operate the transceivers. If the terminal device is capable of operating simultaneously different transmission connections, there can be more than one currently available data connection operated simultaneously. This is especially useful for cellular phones or communicators to provide a telephone connectivity even when currently operating another data communication or connection. Such a communicator can offer e.g. a gateway option, to connect e.g. a Bluetooth-only device e.g. with the internet. The properties of the data connection can be retrieved directly from the bearer of the data connection. The properties of the data connection can be retrieved from a memory containing the properties of potentially accessible data connections within the mobile terminal device. The accessible data connection ~~aeessible~~ can be a data connection currently accessible, or potentially accessible.

According to one embodiment of the ~~invention~~invention, application configurations would change seamlessly depending on the used access technology similar to the automatic activation of car profiles when hooking up a phone to a car kit. Thus the user would automatically use services in a way that fits to the actually selected or available connection type. As an example, the resolution of video connections would be changed such that they are ~~optimised~~optimized to be low cost on a costly medium while performance is ~~optimised~~optimized when the connection is cheap. Some services might even be used on selected media only. For example downloading big file attachments during email ~~synchronisations~~synchronization would happen only when a fast connection is available while a confirmation would be requested on slow

or costly access media. The user confirmation can e.g. be initiated by an application intending to use a data connection.

Advantageously, said obtained properties comprise an identification of said data connection. The obtained properties may contain solely an identification of the available data connection, so that the configurations for the applications can be retrieved. The only available property may be the identification (e.g. the name) of said data connection. Said information can be e.g. the name of the available data connection, so that a user can understand intuitively the principles and the operating principle of the method to simplify user interactions to ~~eustomise~~customize the method. Said identification can be e.g. a proprietary code sequence enabling the adaptation of the configuration of the applications in case of a software implementation of the method. So if the device knows e.g. the maximum data transfer rates of different data transfer connections, the device can select appropriate configurations for its applications ~~only according~~ only to the name of an available data connection.

Preferably, said information is obtained when a specific data connection is selected. Said information can be obtained by being provided simultaneously with a selection ~~for of~~ a certain data transfer connection, or by an automatic information transfer following the selection. The data transmission connection can be selected by a user e.g. by an active selection or following a confirmation request from the terminal device. The transmission connection can be selected automatically e.g. by a selection method according to the state of the art.

Preferably, the said accessible data connection is only potentially accessible. The term potentially accessible data connection is to describe all connections the terminal device is capable ~~to access~~of accessing because of its technical design, and connections the device can access or is capable ~~to access~~of accessing because e.g. a data connection base station is within range. The term potentially accessible data connection can describe a data connection confirmed by a user, independently of the presence of a respective base station. The expression base station is to describe all kinds of devices the mobile terminal device can establish a data connection with.

The potential accessibility of the data connection enables a user e.g. to pre-select a data connection as accessible, even if a respective base station is out of range. So the device or an application on the device can access a selected service when a respective base station is detected by the device or the application. The properties of potentially accessible data connections can be retrieved e.g. from a memory with pre-stored properties of potentially accessible data connections.

At page 6, the paragraph beginning on line 3 has been amended as follows:

Advantageously, the method further comprises a step of detecting a data transfer to be executed by an application. This reduces the number of required adaptations. With the step of detecting a data transfer to be executed, the application can request the currently available data connection only, if a transmission is to be executed. Therefore, only active applications capable of transferring data are ~~only~~-configured, if a transmission really is to be executed. With this method, the number of required adaptations may be reduced.

At page 8, the paragraph beginning on line 1 has been amended as follows:

In the simplest embodiment, the information obtaining means and a connection selection means can form a unit with the means for adapting configurations of applications and can be embodied as a single multi circuit breaker. In this simplest embodiment the multi circuit breaker switches the data transfer channel and the applications of the mobile terminal simultaneously, by switching the hardware connections between respective hardware configurations. In this embodiment the means for obtaining information about data connections currently accessible, is e.g. a ~~mechanical~~mechanical connection between the switch for selecting a data transfer connection and the switches controlling the configurations of the applications. In this simplest case, even the applications can be hardware applications.

At page 9, line 4, please add the following new heading:

BRIEF DESCRIPTION OF THE DRAWINGS

At page 9, line 16, please add the following new heading:

DETAILED DESCRIPTION OF THE INVENTION

At page 9, the paragraph beginning at line 17 has been amended as follows:

Fig. 1 depicts a block diagram of a mobile terminal device according to an embodiment of the present invention. The picture shows an architectural view of an embodiment according to the invention. The device is depicted with four subsystems: a media selection system 2, an access subsystem 4, an application system 6, and a configuration server 8. The media selection system 2 can be e.g. a user confirmed or user selected media selection system or an automatic media selection system. The media represents a communication connection or channel e.g. like Ethernet 10, GSM 12 (Global System for Mobile Communication), UMTS 14 (Universal Mobile Telecommunication Service), Bluetooth 16, WLAN 18 (Wireless Local Area Network) or the like. This includes the different sub-standards and transfer protocols used for these wired or wireless communication connections like e.g. GSM/GPRS (General Packet Radio System), /CSD (Circuit Switched Data), /HCS (High-speed CSD), WAP (Wireless Application Protocol), TCP/IP (Transfer control Protocol / Internet Protocol), and the like. It is to be noted that the device may comprise additional wire or ~~fiber~~ fiber optical connection features, hardware connectivity, and the like. The hardware connections are not explicitly discussed, as the basic features and properties thereof, like data rates, costs, and the like are basically the same.

At page 10, the paragraph beginning at line 1 has been amended as follows:

The access subsystem 4 can establish different data transfer connections, provided that the mobile terminal device is within the range of a respective base station (not shown). In the depicted mobile terminal device, a switch 40 controlled by the media selection system 2 via a control connection 22 selects an access system 10 – 18 of the access subsystem 4. In the depicted embodiment, the mobile terminal device is only capable of using one of the connections at the time provided by the access subsystem 4 because of the structure of the switch 40. An advanced mobile terminal device may be able to communicate via more than one data transfer channel simultaneously, and therefore may comprise an additional switch or ~~according-hard-~~ or software elements accordingly. Such a mobile terminal device may provide a multi connectivity or even gateway functionality.

At page 10, the paragraph beginning at line 26 has been amended as follows:

In case of the e-mail application, the different settings can comprise application settings of the application not directly related to an actual transmission connection. Due to ~~to~~ a lower data rate and higher cost of the connection, downloading attachments exceeding a certain size limit might be disabled when GSM 12 or UMTS 14 are the access media, while the full data rate is used in all other cases (default). The configuration server provides the information depending on the selected media to the application. The functionality could be part of the application as well.

At page 11, the paragraph beginning at line 1 through the paragraph ending on line 7 have been amended as follows:

In the case of the application 52, e.g. a video application, the application system 6 sets the switch 46 on a position to provide a default configuration 20 for Ethernet to the video application 52. The configuration provides on the one hand a transmission according to the preferences of the user, and on the other hand saves the resources of the mobile terminal device.

In the case of ~~than an~~ arbitrary application 56, the application system 6 sets the switch 48 on a position to provide the configuration 10 for Ethernet to the arbitrary application 56.

At page 11, the paragraph beginning at line 23 has been amended as follows:

The media or data transfer connection selected by a user or an application is used as the primary access media. As WLAN/Bluetooth is supported in areas (hot spots), and because of the wireless nature of the transmission system, it is clear, that the access subsystem, the media selection subsystem, the configuration server and/or the applications may comprise the capability of an availability determination. The mobile terminal device can be capable of detecting the availability of data transmission connections, of base stations, and may be able to select the transmission connection automatically or by user confirmation. The mobile terminal device can e.g. sweep the different ~~connection~~connections to determine if a base station is within range. Preferably, the mobile terminal device may determine the availability of the transfer connection on the basis of an expected or estimated transfer variables, e.g. a minimum remaining transmission capacity e.g. on the basis of e.g. a prepaid account, a battery capacity, or the like.

At page 12, the paragraph beginning at line 1 through the paragraph ending at line 17 have been amended as follows:

It should be noted, that the configurations may be pre-configured for products to ~~minimise~~minimize user interaction. The pre-configured configuration server entries

can be pre-stored on the mobile terminal device, can be varied by the user and/or can be updated by data transmission from a service provider such as the manufacturer or the provider of the data connection.

Figure 2 depicts a flowchart of an application adaptation method according one embodiment of the present invention. The method is to be used in a mobile terminal device to adapt the configuration of at least one ~~applications~~application to a data connection available. The flowchart comprises two main steps 100 and 102. In step 100 the properties of a data connection actually available on said mobile terminal device (MTD) are detected and obtained. In step 102 the configuration of said application on said terminal device is adapted in accordance with said properties obtained.

By changing application profiles/configurations depending on the current (available or selected) access technology (or data transfer connection), users do not have to interact with the underlying technology as much as before. Therefore, the user can use different applications with different data exchange technology faster and easier. As devices that support multiple access technologies are not yet common, the problem has probably not been ~~recognised~~recognized fully yet.

At page 13, the paragraph beginning at line 17 has been amended as follows:

The flowchart of figure 3 includes the steps 100 and 102 from figure 2, and extends the flowchart on one side by the steps ~~90 and 92~~70 and 72, and on the other side by the step 80. Step ~~90~~70 is a selecting or a determining step if a data transfer connection is available. If the data transfer connection is ~~quoted~~selected or determined to be available, the active applications on the MTD are detected in step ~~92~~72 and the configurations of said active applications adapted to the currently available data transfer connection. In the case that e.g. no application is active, no configurations are adapted. The steps ~~90 and 92~~70 and 72 reduce the number of adaptations if, e.g. only a few applications are actually active.

At page 13, the paragraph beginning at line 31 through the paragraph ending on page 14, line 21 have been amended as follows:

The implementation can be done in SW (software) by providing access technology characteristics and associated user preferences via an access technology configuration server (a piece of SW). Applications would retrieve the configuration information from such a server when they are started or when they perform certain actions (e.g. ~~synchronises~~synchronize email). Additionally, the server could send messages to applications as well as informing them about changing configurations due to changes of the media. The server would provide data on request but could as well issue a change event to running applications in case a profile change happens.

The flowchart depicted in figure 3 illustrates basically the same method depicted in figure 2 with the ~~difference~~difference that only the configurations of active or operating applications are adapted to the characteristics of currently available data connections. Applications started after the selection or the detection of available data transfer connections may not be adapted to the currently available data transfer connection and have to be adapted following their activation. While in figure 2 all applications are adapted, in figure 3 the adaptation is only executed if an application is active.

Figure 4 depicts a flowchart with a ~~minimised~~minimized number of adaptations. The adaptation may only be ~~only~~-executed if a data transfer to be executed is detected, as in step 90. This may further reduce the number of adaptations to be performed. An application is started in step 80, it keeps running on the MTD until the MTD or the application detects a data transfer to be executed in step 90. This transfer can be an incoming or an outgoing data transfer. Following the detection, the properties of an available data transfer connection is obtained in step 100 and the configuration of the application is adapted accordingly in step 102. ~~Followed by the~~This is followed

by a data transfer in a step 40492. This is the method with the lowest number of adaptations of configurations.

At page 15, the paragraph beginning on line 1 through the paragraph ending on line 25 have been amended as follows:

It should be noted that the MTD may be provided with pre-set numbers of configurations, so that the MTD can provide the features of the invention directly after being sold without the need of further user interaction. The configurations to be retrieved may be updated by using one of the data ~~connection~~connections provided by the MTD. The configuration may be provided from a manufacturer or from a data transfer connection provider, such as a internet provider, a mobile communication net provider or the like. The configurations may be downloaded from the internet, WAP, I-Mode Internet or the like, ~~respectively~~. It is to be noted that the user may ~~customise~~customize the ~~configurations~~configurations by user input.

It should also be noted that the expression data transfer channel and data channel is used to describe the different data transfer media such as wired and wireless transfer media such as Ethernet, Twisted Pair, ~~fibrefiber~~ optical, infrared, radio and the like, different data transfer standards such as GSM, UMTS, Bluetooth, WLAN and the like, but also the different data transfer modes within said standards as e.g. GPRS, CSD or HCSD for the GSM Network.

It should further be noted that the MTD can be a mobile telephone, a communicator, a portable computer such as e.g. a laptop, palmtop or tabloid ~~computer~~computer, a PDA (Personal Digital Assistant) or the like with multi-connectivity. The term “multi connectivity” is used to describe devices capable of communicating via different communication media.

Lastly, it should be noted that the three methods may be combined, so that e.g. the mobile terminal device can automatically decide which of the three depicted methods is the best to be applied according to parameters ~~like~~such as the total number of active applications, the number of available applications, the number of technically or actually available data transfer connections, or the ratios of said numbers.